

Overview of Transportation Safety

Senate Transportation Committee

Charlie Howard

Director

Strategic Planning & Programming

Douglas B. MacDonald

Secretary of Transportation

Paula Hammond

Chief of Staff

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**Washington State
Department of Transportation**

Updating Washington's Transportation Plan

In developing Washington's Transportation Plan, WSDOT uses data to determine where problems occur and the effectiveness of potential solutions.

What did we find regarding transportation safety?

- WSDOT and others have investigated safety on the transportation system and have found good records of safety for ferries, rail, and aviation, though there remain a few concerns**
- Our findings indicate that safety on our roadways is the big problem, including bicycle and pedestrian safety**

Washington State Ferries

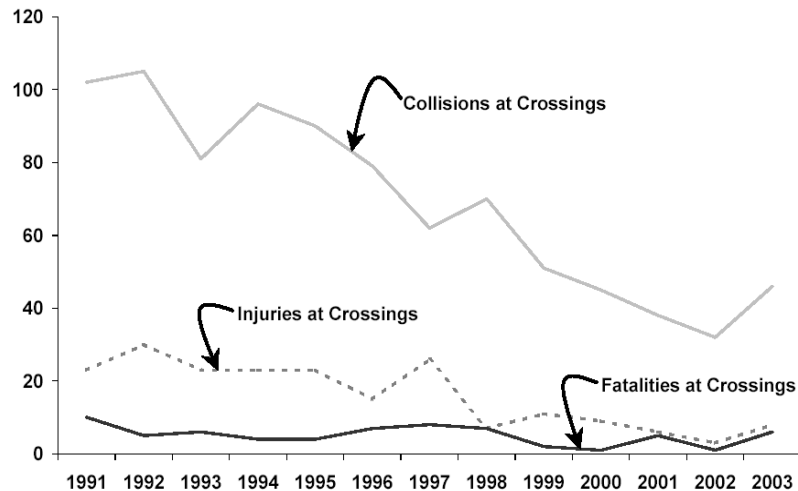
An excellent safety record

In 2002:

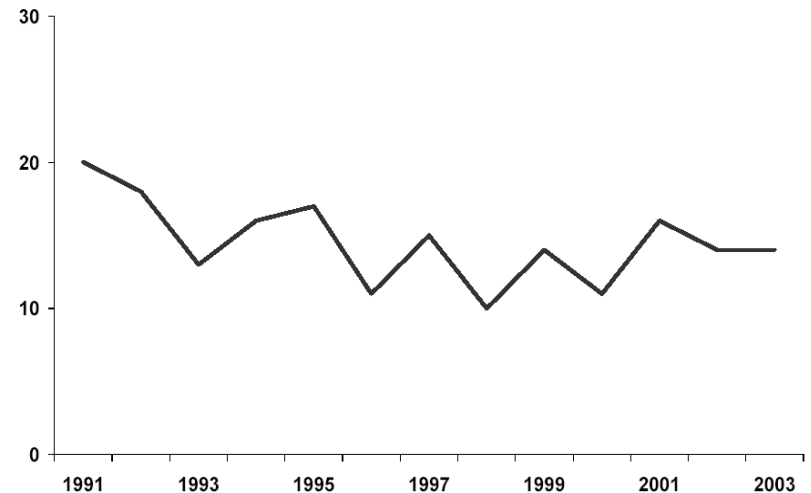
- 28 vessels (as of 2004), 10 routes, 20 terminals
- 25.2 million passengers
- 15,192 sailings
- 100 minor injuries on vessels, 33 minor injuries at terminals
- No fatalities or disabling injuries

There are two safety concerns on railroads: grade crossings, which are getting safer due to signage, signalization, and grade separations, and trespassing, which remains a concern.

Rail Road Collisions, Injuries and Fatalities at Crossings in Washington State 1991-2003

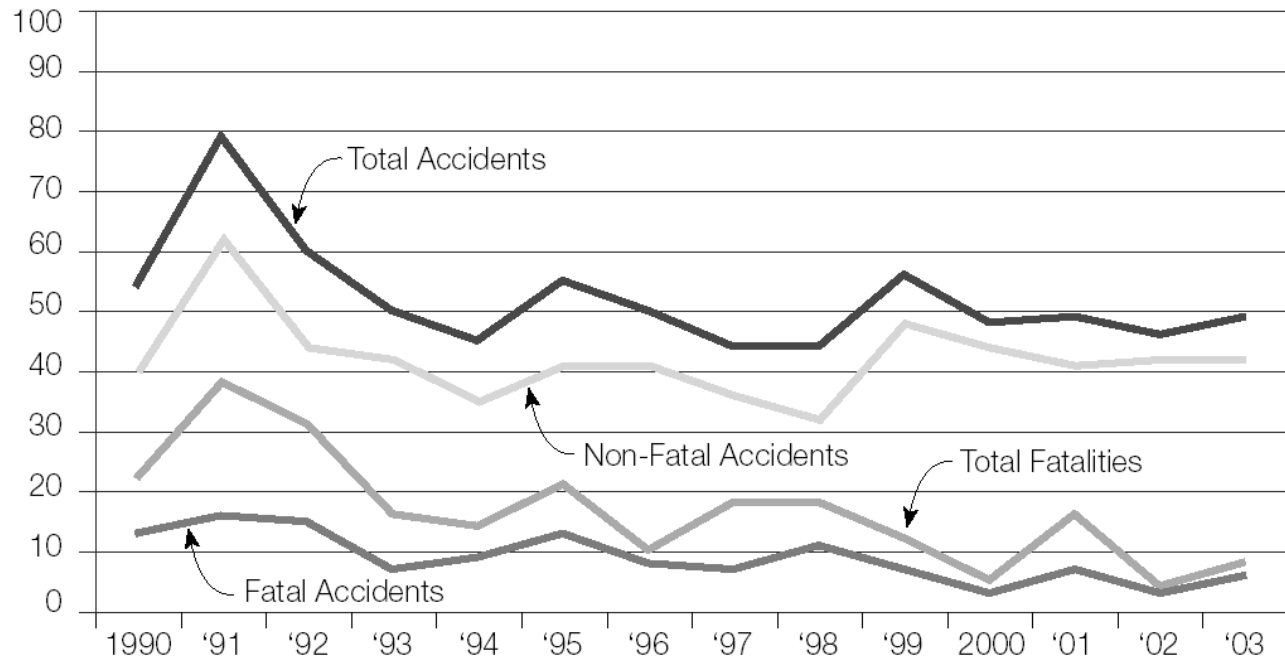


Number of Fatalities Related to Trespassing on Washington Railroad Properties 1991 - 2003



Pilot error is the number one cause of general aviation accidents.

Washington State General Aviation Accidents 1990-2003



Roadway Safety---What's going on?

Fatalities are down but still too high – 600 people died in motor vehicle collisions in Washington in 2003. Motor vehicle collisions cost Washington \$5.6 billion per year.

The main contributing factors are:

Behavior:

Speed – Excessive speed is a factor in 25 percent of fatal collisions

Alcohol – 40 percent of fatalities involve impaired driving

Age – Younger drivers have the highest fatality rate

Seatbelt use – Only 5 percent of drivers don't use seatbelts, but they account for almost half of all fatalities

Roadway:

Rural Two-Lane Roads – While urban and rural roads have about the same number of fatalities, the fatality rate on rural roadways is almost twice that in urban areas. On rural two-lane roadways, the rate is even higher.

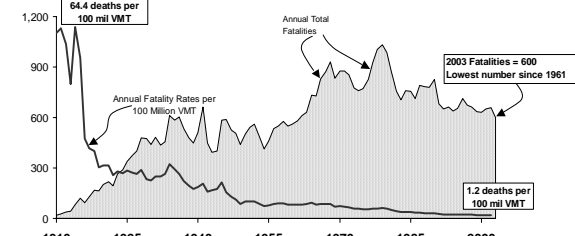
Cross-over protection – Head-on collisions continue to be an issue, especially in rural areas

Behavioral programs will be controversial.

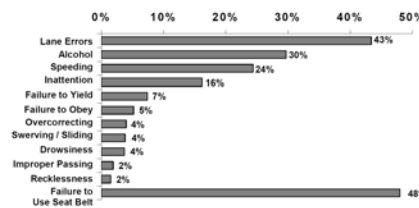
How do we get the last 5% of people to use their seatbelts, and how do we further reduce aggressive and drunk driving?

Washington Motor Vehicle Total Fatalities and Fatality Rates *

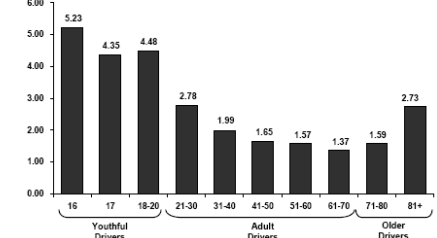
1910 - 2002



Driver Errors and Behaviors Associated With Fatal Collisions in Washington State 1993 - 2001

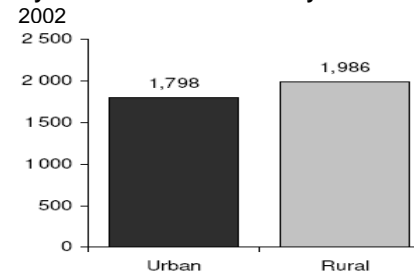


Rate of Fatal Collisions by Driver Age Group: Washington State 8-Year Average 1993 - 2000 Per 10,000 Licensed Drivers



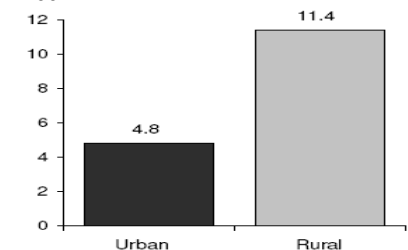
Number of Fatalities and Disabling Injury Collisions

By Urban and Rural Roadways

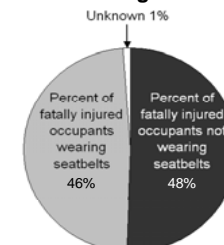


Rate of Fatalities and Disabling Injury Collisions By Urban and Rural Roadways

Rate Per 100 Million VMT



Fatalities of Users and Non-Users of Seatbelts in Washington State 2002



Note: The other 5% occurred in other types of vehicles such as motorcycles and large trucks.

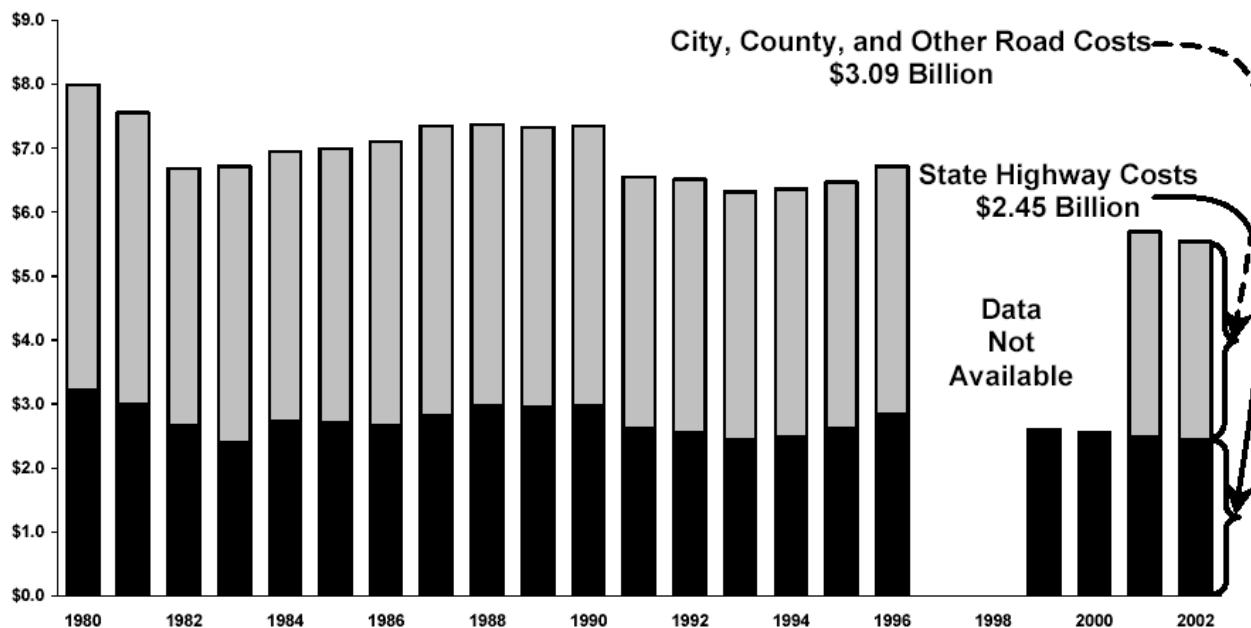
How much do accidents cost Washington citizens?

Accidents on Washington roadways cost about \$5.6 billion dollars a year – more than three times what we spend on transportation infrastructure each year.

That's \$930 for each person in Washington.

Societal Costs of Motor Vehicle Collisions in Washington State 1980 – 2002

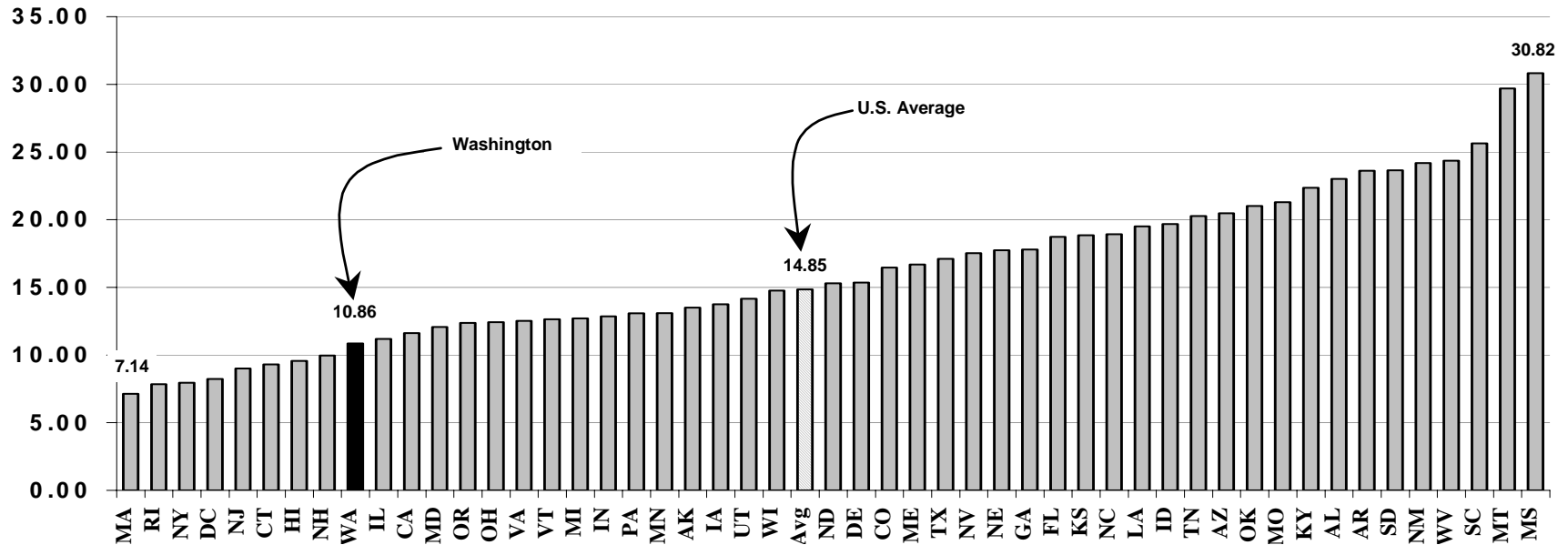
Cost in 2002 Dollars (in Billions)



Washington's Safety Record Compared to Other States

Rate of Fatalities Per Capita in the U.S.

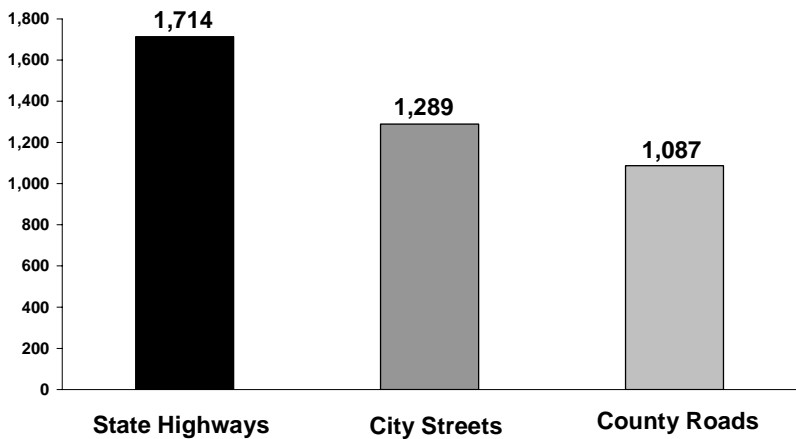
Traffic Death per 100,000 Population in 2002



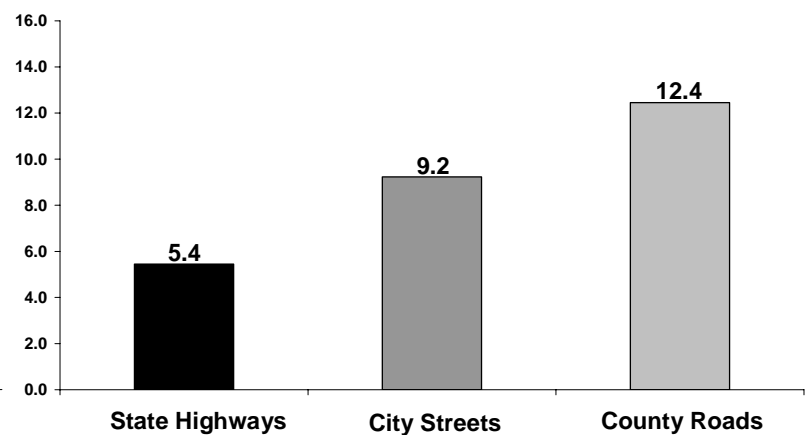
Washington State's rate dropped another 8.8% in 2003 to 9.84.

Roadway Safety---Where are the accidents?

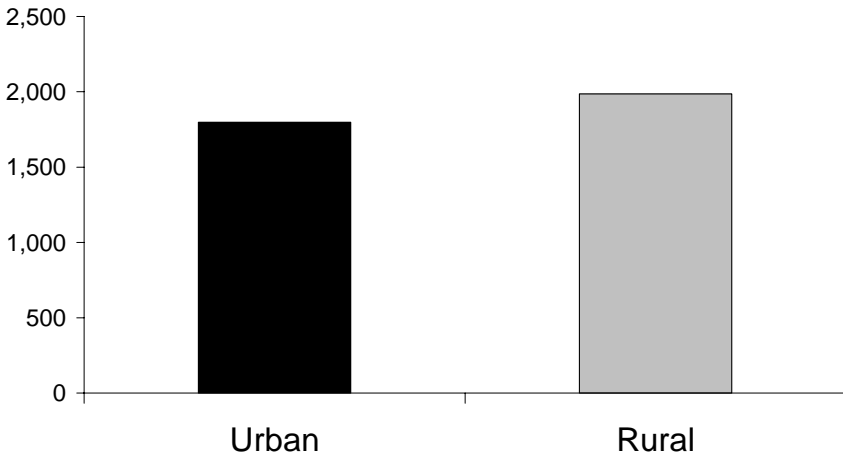
**Number of Motor Vehicle Fatalities and
Disabling Injury Collisions
By Roadway Type in Washington State*
2002**



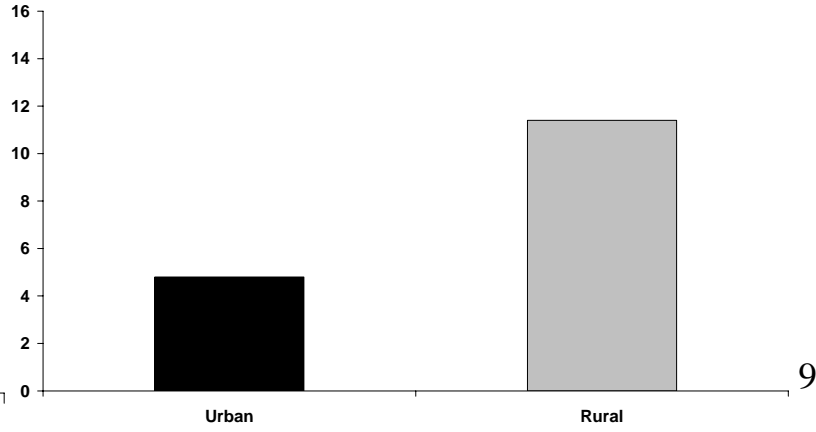
**Rate of Motor Vehicle Fatalities and
Disabling Injury Collisions
By Roadway Type in Washington State*
Per 100 Million VMT
2002**



**Number of Fatalities and Disabling Injury
Collisions
By Urban and Rural Roadways
2002**

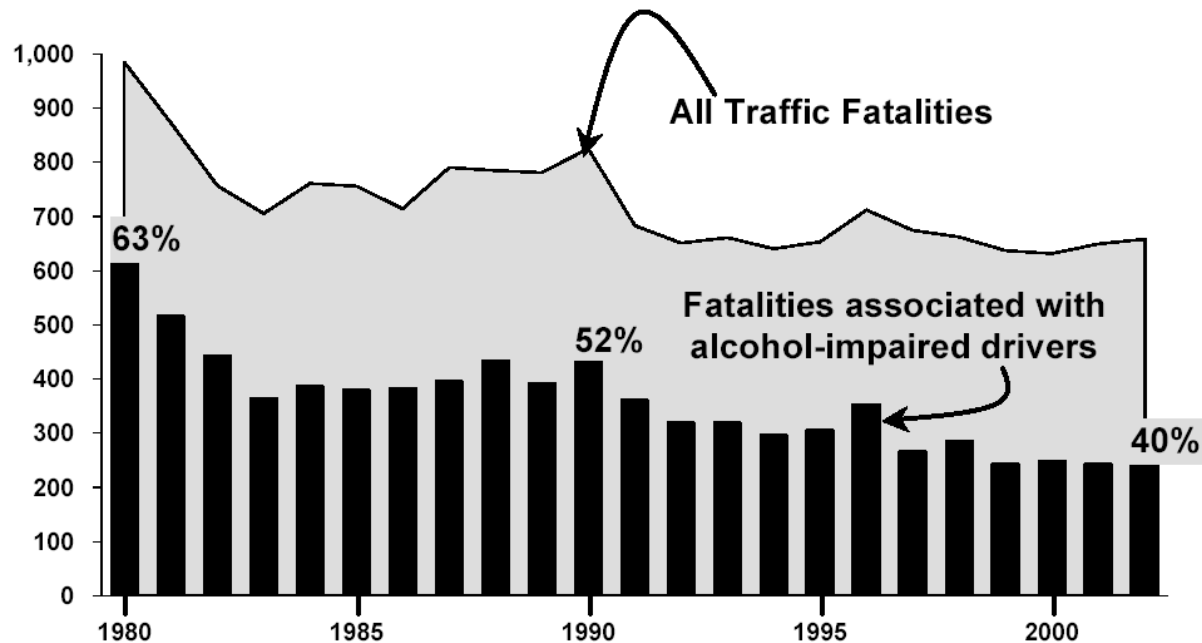


**Rate of Fatalities and Disabling Injury Collisions
By Urban and Rural Roadways
Rate Per 100 Million VMT
2002**



Fatal motor vehicle accidents show a very high correlation, although declining, with driver impairment by alcohol or other substances.

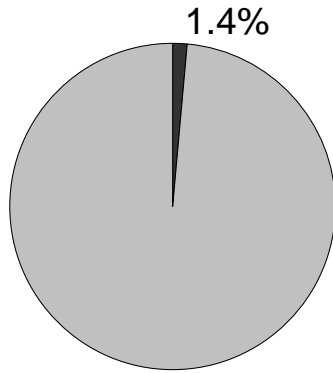
**Trend in Rate of Driver Alcohol Impairment
Associated with Motor Vehicle Fatalities
in Washington State
1980 - 2002**



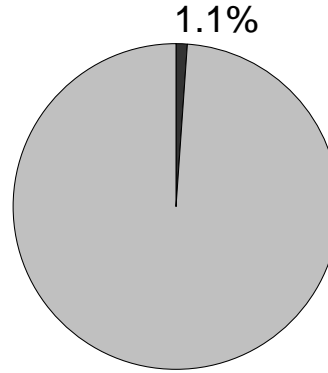
Types of Road Users—Pedestrians, Bicyclists, and Motorcycles

Pedestrian fatalities have declined slightly since 1993 but still show a significant problem when looking at fatal and disabling injuries. Bicycle fatalities remain steady. While the rate of all collisions that involve motorcycles is only 1.0%, the percent of fatal and disabling collisions that involve motorcycles is a disproportionate 12%.

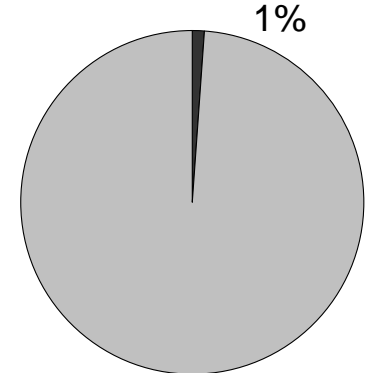
Percent of All Collisions Involving Pedestrians in 2002



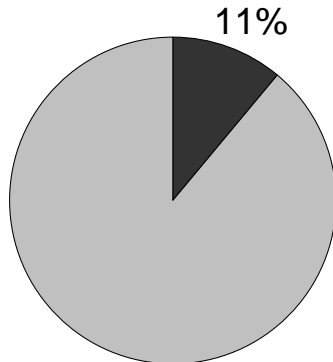
Percent of All Collisions Involving Bicyclists in 2002



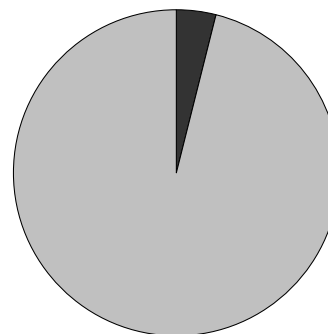
Percent of All Collisions Involving Motorcycles in 2002



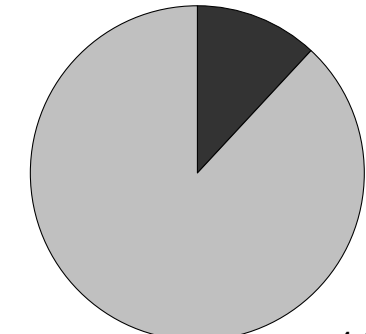
Percent of All Fatal and Disabling Collisions Involving Pedestrians in 2002



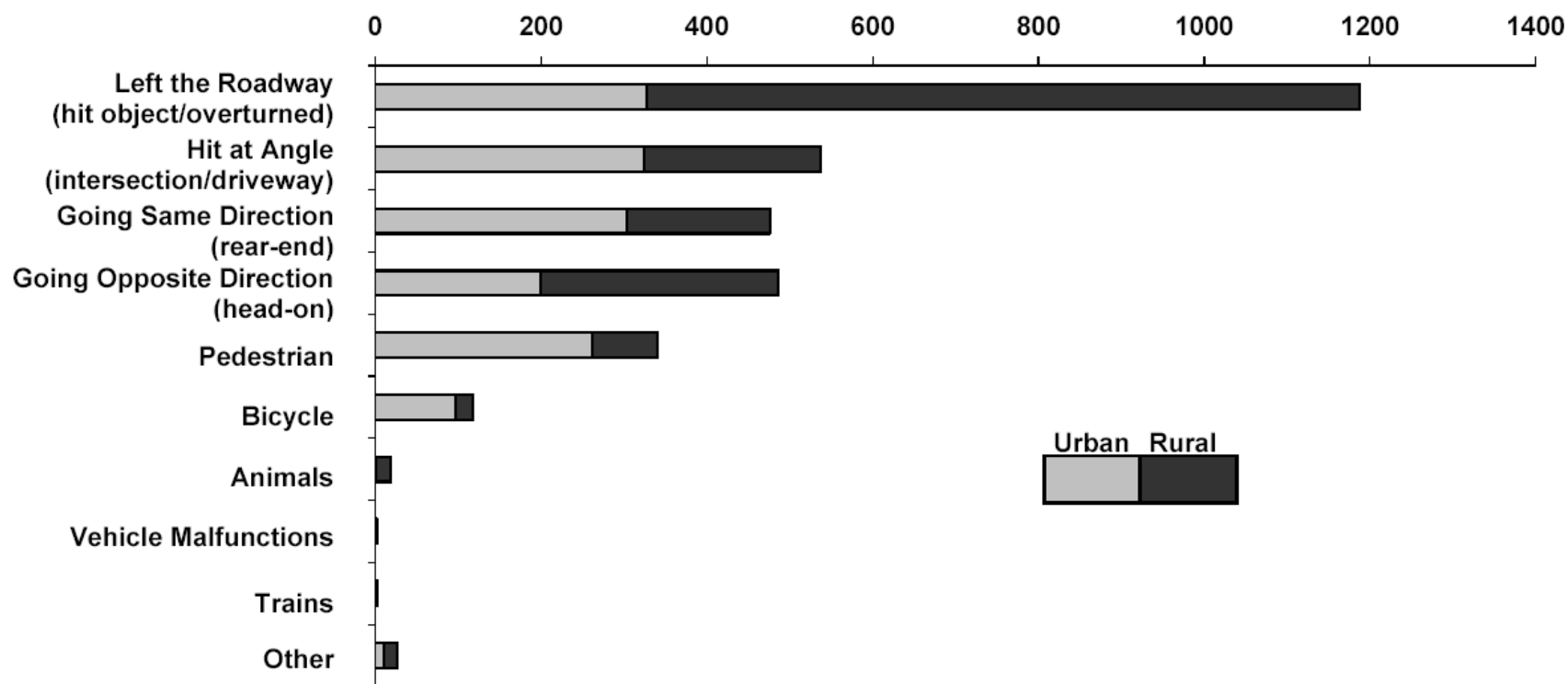
Percent of All Fatal and Disabling Collisions Involving Bicyclists in 2002



Percent of All Fatal and Disabling Collisions Involving Motorcycles in 2002



Roadway Circumstances and Conditions Associated with Fatal and Disabling Injury Collisions in Washington State 2002



Identification and programming of safety projects

WSDOT's data show that roadway deaths, injuries, and property damage can be reduced through both behavioral programs (education and enforcement) and engineering.

Coordinated effort of traffic safety education, enhanced enforcement, engineering improvements and enhanced emergency response improves roadway safety.

Community Corridor Safety Program Gets Results

The Corridor Safety Program is a partnership between WSDOT, the Washington Traffic Safety Commission, and the Washington State Patrol. Local collaboration improves safety in specific corridors, using low-cost approaches and building strong local partnerships. In each locale a committee representing a wide range of interested community members and groups coordinates the effort. The Corridor Safety Program was awarded Governor Locke's 2002 Governor's Award for Public Benefit.

U.S. 97A between Wenatchee and Chelan

This 40-mile-long U.S. 97A corridor had a high number of single-vehicle accidents. Compared to similar highways in the region, 97A experienced

300% more wildlife collisions, 188% more alcohol-related collisions with 176% more fatalities and disabling injuries, as well as higher percentages of "failure to yield" and "driver inattention" collisions.



The project reduced collisions, injuries and deaths through the "Four Es" – education, enforcement, emergency services and engineering.

Highlights of these approaches include:

Education

- Presentations to community groups and schools
- Public Safety Announcements
- Project website (active through end of 2001)

Enforcement

- DUI emphasis patrols
- Coordinated multi-jurisdictional law enforcement
- Highway Watch Program

Emergency Services

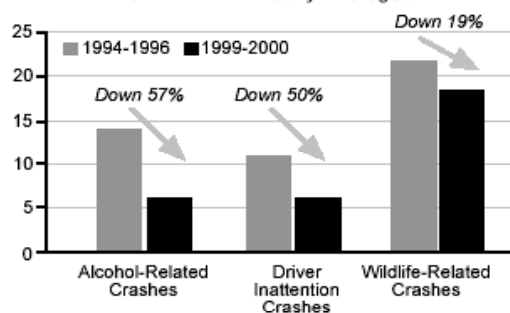
- Improved use of 911 system
- Development of more incident response teams
- GPS equipment to pinpoint emergency scenes

Engineering

- Additional warning and hazard signs
- Wildlife fences and reflectors
- Enhanced paint striping program
- Attention-getting signing ("Killed by Drunk Driver")

U.S. 97A Reduction in Crashes

1994-1996 vs. 1999-2000 Yearly Averages

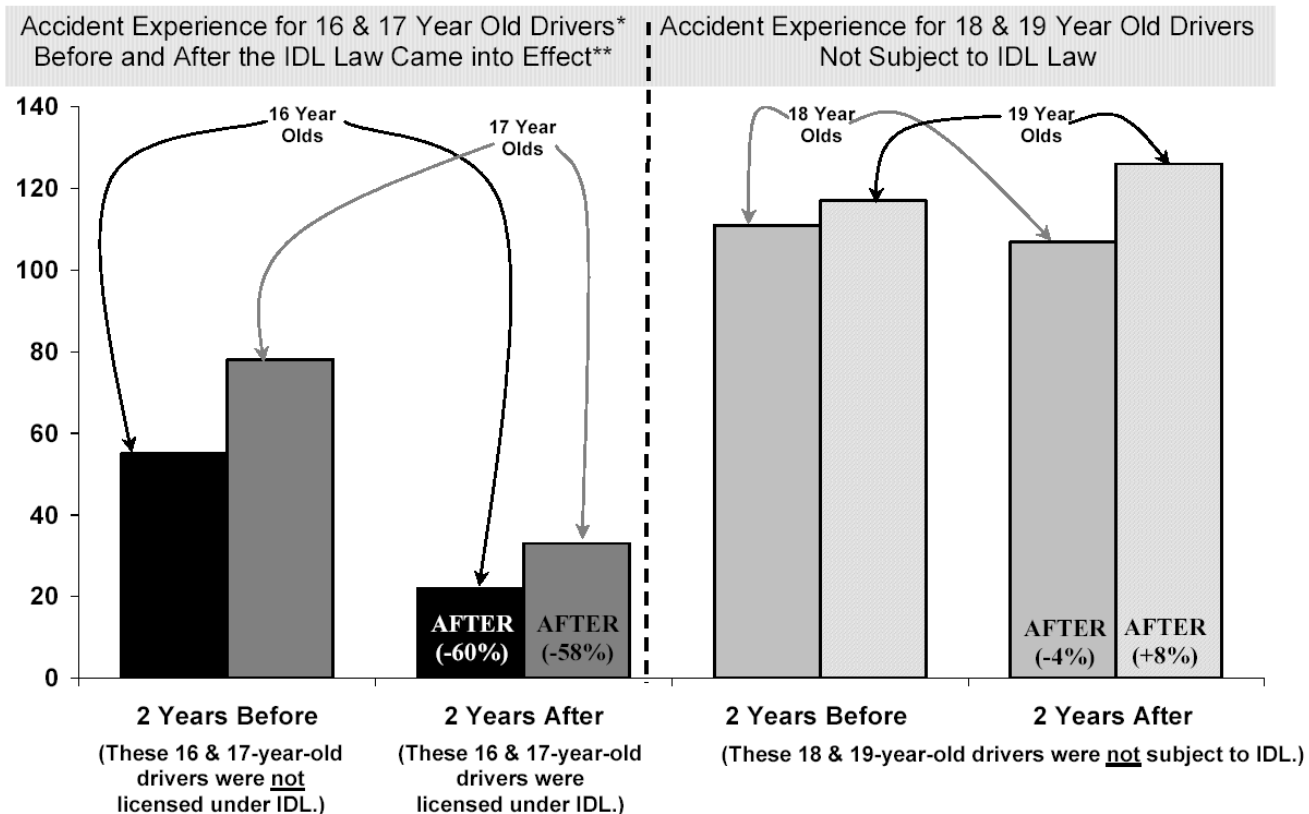


Source: WSDOT Traffic Office.

The program is cost-effective: every dollar invested saves approximately \$35 in societal costs.

Early statistical results seem to show that the Intermediate Drivers License (IDL) law has had a significant and welcome effect

Number of Fatal and Disabling Injury Accidents for 16 to 19 Year Old Drivers* Before and After IDL Law**



Highway Safety in WSDOT Programs

Operating Programs

Highway Maintenance

Maintenance of highway safety features and activities include:

- Guardrail
- Bridge Rail
- Signing
- Lighting
- Snow and Ice Control

Traffic Operations

Operation of traffic control devices and spot safety improvements such as:

- Installation of additional signing
- Striping modifications
- Minor Enhancements

Capital Highway Safety Improvement

Safety is addressed in all WSDOT projects

WSDOT's targeted safety program improves highway safety by reducing the severity and number of existing accidents.

Spot locations

- High Accident Locations (HALs)
(These typically occur at intersections and sharper curves)
- Pedestrian Accident Locations (PALs)

Segments

- High Accident Corridors (HACs)
(These segments are at least a mile long)

WSDOT's targeted safety program also improves highway safety by preventing accidents at high risk segments before they occur.

- Interstate Safety Matrix
(Agreement with FHWA to meet standards)
- Roadside Risk
- At – Grade Intersections
- Signalization & Channelization
- Pedestrian Risk
- Median Cross-Over Protection
- Centerline Rumble Strips

Three New Safety Initiatives for 2005-07

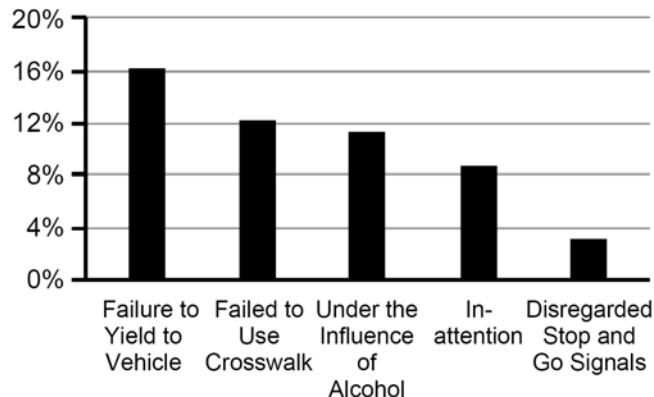
1. Addressing Pedestrian Risk

Research by the Washington State Transportation Center has shown that 80% of high pedestrian accident locations occur within 100 feet of a transit stop.

Evaluation of all pedestrian collisions is necessary to understand pedestrian safety problems. The chart below shows the most frequent contributing factors for pedestrians in vehicle/pedestrian collisions. Contributing circumstances for drivers are not shown.

Most Frequent Pedestrian Factors in Vehicle/Pedestrian Collisions on State Highways

Percent of Pedestrian Accidents, 1996-2001



Future editions of the Gray Notebook will further examine pedestrian safety on state highways.

Source: WSDOT Transportation Data Office.



2. Median Cross-Over Protection: Cable Median Barrier

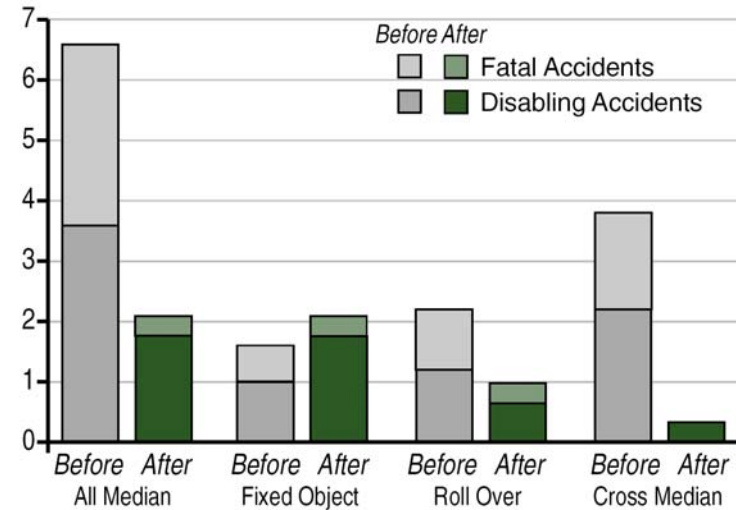
While total collisions in the study areas nearly doubled (from 45 to 100, including property damage only collisions), the number of severe collisions (fatal and disabling) decreased significantly.



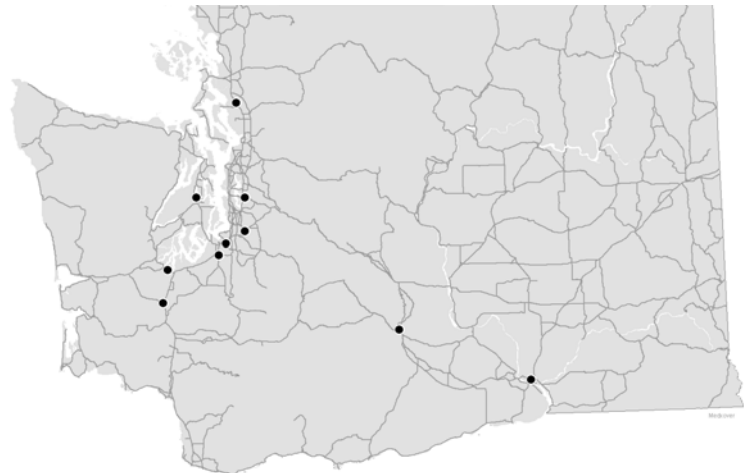
The picture above shows the Centerline cable median barrier for divided highways.

Severe Collisions

*Before and After Cable Median Barrier Installation
Annual Fatal and Disabling Collisions and Median Collision Type*



Source: WSDOT Engineering and Regional Operations Division.



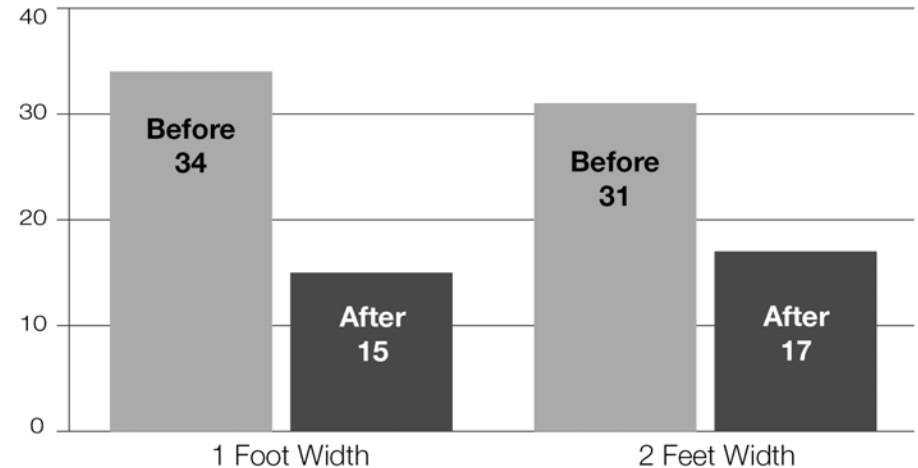
3. Median Cross-Over Protection: Centerline Rumble Strips

Centerline rumble strips provide an immediate reduction in cross-over collisions on two-lane rural undivided roadways.

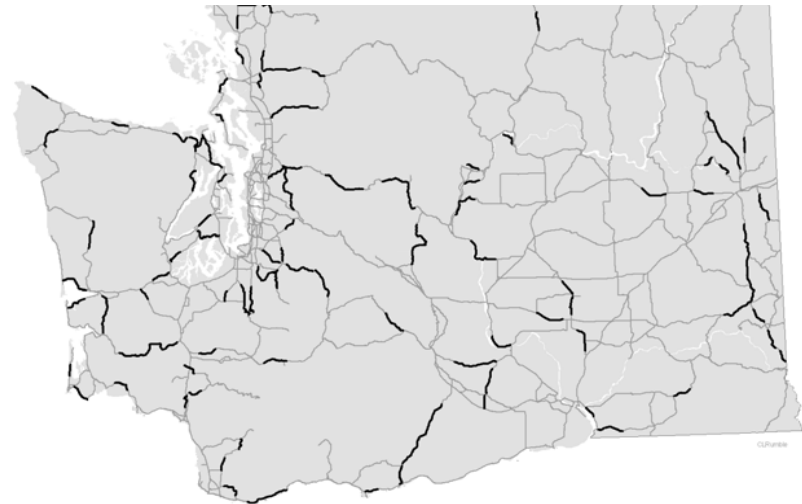
- 57% drop in cross-over collisions (rumble strips at one-foot centers)
- 47% drop in cross-over collisions (rumble strips at two-foot centers)



Number of Crossover Crashes on U.S. 12 between Tri-Cities and Walla Walla



Source: WSDOT Highways and Local Programs



The map above shows potential centerline rumble strip locations.

Safety Projects – Before and After Results

Each year, WSDOT completes a variety of safety improvement projects throughout the state highway system, ranging from adding turn lanes and signals to installing median barrier and rumble strips. To begin to determine their effect on reducing the number and severity of traffic collisions, a preliminary before-and-after study has been conducted for 21 such projects.

Projects were chosen to be analyzed in the before period, and at least 12 months in the after period. The data was then normalized (12 month average) to make a fair comparison.

Combined Average for 21 Safety Projects
Collisions Per Year

	All Types	Property Damage Only	Injury/Fatal
Before	15.5	8.8	6.7
After	9.7	5.5	4.2

Source: WSDOT Transportation Data Office.

Preliminary results for this 21 project sample indicates:

- **37%** reduction in the average number of **total** collisions per year
- **37%** reduction in the average number of **fatal and disabling** collisions per year

Examples of Cost Effective Safety Strategies

I-90 Gold Creek to Easton Hill Vicinity, Kittitas County

Screens were installed to the median at these two locations to reduce the night time headlight glare from on-coming traffic.

- **29%** decrease in total night time collisions
- **60%** decrease in property damage only



Glare screen installed on median barrier along I-90.

SR 99 Battery Street Tunnel, Seattle

The concrete roadway was ground to increase friction in order to reduce the number of collisions on wet pavement.

- **79%** decrease in total wet pavement collisions
- **50%** decrease in injury collisions only



Concrete pavement grinding to increase friction on SR 99 at the Battery Street Tunnel in Seattle.

Safety in a Roundabout Way

Port Orchard Roundabout Safety Improvement

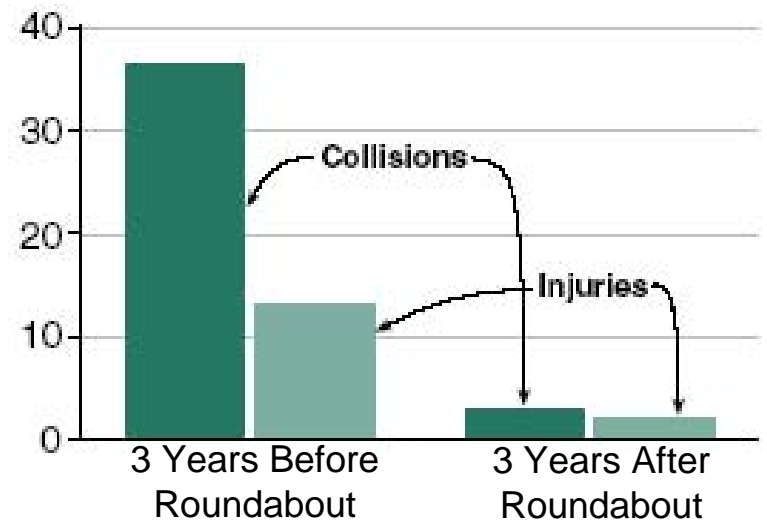
During the late 1980s and early 1990s, traffic growth in the City of Port Orchard in southern Kitsap County overwhelmed the intersection of Bethel Avenue and Mile Hill Drive (SR 166), eventually generating enough injury and property collisions to classify the intersection as a high-accident location (HAL). Vehicle speeds exceeding the posted speed limit and the intersection configuration contributed to the collision problem. In the mid-1990s, after approval of the design by WSDOT, the City of Port Orchard built a “modern” roundabout, the first of its kind on the state highway system and the second to be built in Washington.

After the construction of the single-lane roundabout, crash data supports how well a roundabout can work when applied to a site-specific intersection safety problem. There are now 48 roundabouts in Washington.

*Port Orchard –
Bethel Ave. and
Mile Hill Drive
Intersection*



Number of Collisions and Injuries *Before and After Roundabout: Comparison*



Source: WSDOT Engineering and Regional Operations Division.

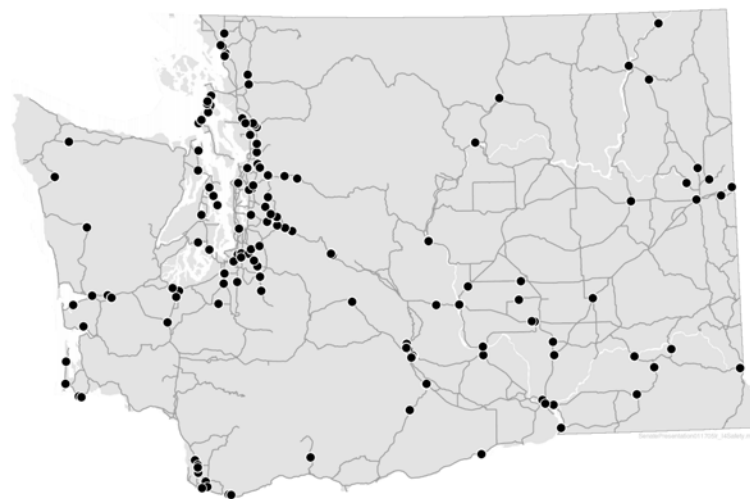
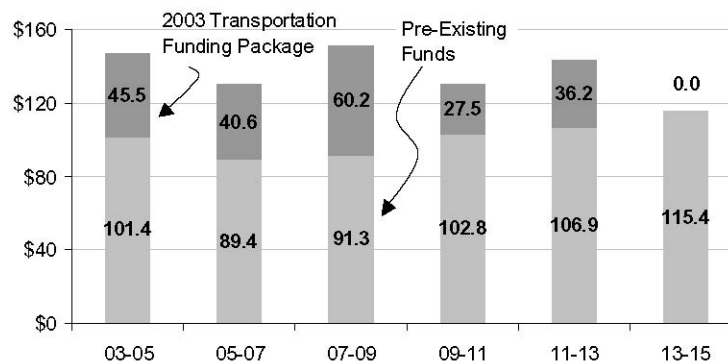
Benefits from 2005-07 Planned Projects

Historical data shows that at the locations where projects are planned for 2005-07, an average of 5,200 accidents occur per year. Upon completion of these projects, the numbers of accidents that occur on an annual basis at these locations are estimated to drop by over 1,000.

This estimate does not include benefits from the following three investments:

- Installation of centerline rumble strips
- Upgrade of existing substandard guardrail
- Upgrade of existing substandard bridge rail

Targeted Safety Investments
Ten Year Plan for Pre-Existing Funds and
2003 Transportation Funding Package
(Dollars in Millions)



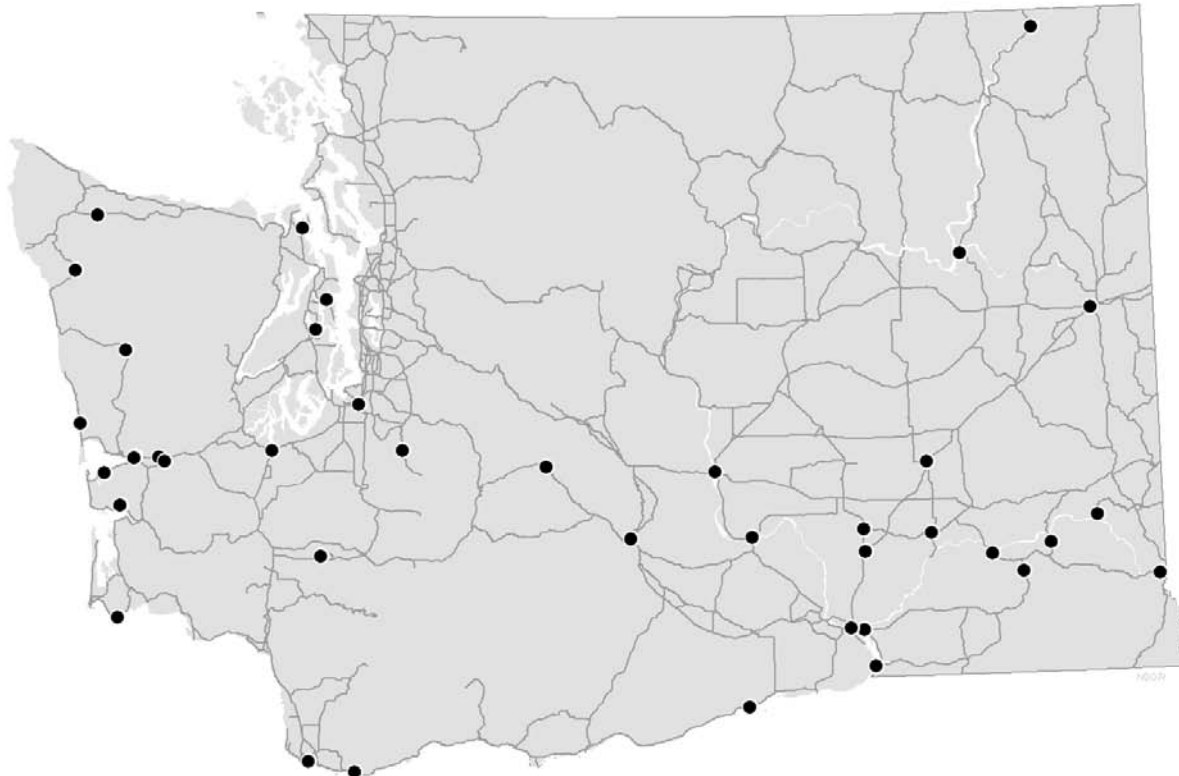
Locations of 2005-07 planned projects

2005-07 Planned Guard Rail and Bridge Rail Upgrades

(2003 Funding Package)

There are some older Guardrail and Bridge Rail that do not meet current safety standards.

The map below displays locations that will be upgraded during the 2005-07 biennium.



Priorities for New Funding

- Highest priorities were funded with current revenue
- More projects remain
 - Median Cross-Over
 - Accident locations in cities over 22,500 on state highways
 - Pedestrian Risk
 - 2-Lane Rural Roadways
 - Remove fixed objects within clear zone
 - Add passing lanes